

Final Report

**Secondary Road Fund Distribution
Advisory Committee**

2002 to 2005

**Submitted per the requirements of Section 312.3C of the
Iowa Code**

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INTRODUCTION

This report presents the findings and recommendations of the Secondary Road Fund Distribution Advisory Committee [SRFDAC] established by SF 2192 of the 2002 Iowa Acts.

Section 312.3C of that bill directed that:

- A secondary road fund distribution advisory committee is established to consider methodologies for distribution of moneys in the secondary road fund and farm-to-market road fund.
- The committee shall be comprised of representatives appointed by the president of the Iowa county engineers association, the president of the Iowa county supervisors association, and the Department of Transportation.
- The committee shall recommend to the general assembly, for the general assembly's consideration and adoption, one or more alternative methodologies for distribution of moneys in the secondary road fund and the farm-to-market road fund.

Currently, road use tax funds (RUTF) for county roads are distributed via the secondary road fund and the farm-to-market road fund. The existing methodology for distributing those funds among counties is based 70 percent on each county's share of 'needs' and 30 percent on each county's share of area. County 'needs' are calculated by the Iowa Department of Transportation (DOT) and are intended to reflect twenty years of construction, maintenance, and administration needs for county roads and bridges.

The DOT and counties in Iowa have been frustrated over time with the challenges of estimating needs and resulting impacts on road fund distribution. Specific issues with the need study include:

- Need study results that fluctuated excessively, with some counties seeing their RUTF allocations increase or decrease by multiple hundreds of thousand dollars every four years.
- Like counties were not being treated alike, with some being chronically over or under funded.
- Reliance on condition data that was updated only every ten years, which meant that much of the input data in each new cycle was seriously out of date.
- It provided inverse incentives - rewarding under-maintenance and over-paving.

As a result of those issues the SRFDAC committee was created to study and recommend a new method for distribution of the secondary and farm-to-market road funds.

This report documents the committee's efforts and recommendation.

COMMITTEE SETUP

After SF 2192 became law in July 2002, the Iowa County Engineers Association appointed six engineers, the Iowa State Association of County Supervisors appointed six supervisors, and the DOT designated Office of Systems Planning Director Stuart Anderson and Office of Local Systems Director Larry Jesse to serve on the committee.

Care was taken to assure that the appointees were balanced by size, (area and population), geographic location within the state, and party affiliation -- so that all viewpoints would be adequately represented.

Committee membership was as follows:

| Representation | Engineer | Supervisor |
|-----------------------|--|-------------------------|
| <i>Small County</i> | Wayne - Tim Ehrich | Union - Mike King* |
| | Page - Jim Christensen | Hamilton - Wes Sweedler |
| <i>Medium County</i> | Plymouth - Tom Rohe* | Tama - Larry Vest |
| | Carroll - Dave Paulson | Clay - Sylvia Schoer |
| <i>Large County</i> | Scott - Larry Mattusch | Linn - James Houser |
| | Story - Bob Sperry | Dubuque - Donna Smith |
| <i>Iowa DOT</i> | Systems Planning - Stu Anderson [Ex officio] | |
| | Local Systems - Larry Jesse [Ex officio] | |

* - co-chairs

Additional participants, called upon by the committee to attend and contribute:

- Mike Wentzien - Legislative liaison for Iowa State Association of County Supervisors (ISACS)
- Steve De Vries - Executive Director of Iowa County Engineers Association Service Bureau (ICEASB)
- Omar Smadi - Pavement management systems specialist from Iowa State University's Center for Transportation Research and Education. (CTRE)
- John Easter - Governmental affairs representative - Iowa State Association of Counties (ISAC)
- Royce Fichtner - Legislative liaison -- Iowa County Engineers Association
- Richard Schiek - 2004 President -- Iowa County Engineers Association
- Randy Will - 2004 Vice President -- Iowa County Engineers Association

GOALS

Starting from the direction provided in SF 2192, the committee established the following goals:

1. Develop a more stable and predictable system

The first objective was to try to eliminate the large, hard to explain swings in allocation factors that have plagued the need study methodology.

2. Allocate funding in a manner that best serves all citizens.

The committee felt that a good allocation plan would be one that provided sufficient funds to all counties to maintain an adequate system while also responding to long term demographic changes..

3. Reduce or eliminate inverse incentives.

The committee members recommended that any new method would need to be designed so as a) to avoid 'rewarding' under-maintenance and b) to neither over-reward nor penalize paving new miles.

4. Treat like counties alike

The committee members also wanted to find or devise a formula that would allocate roughly the same amount of funds to any pair of counties of similar size, road system, and traffic.

5. Decide whether to use a near term or long term point of view

The committee wanted to determine whether RUTF allocations should be made on

- the basis of both system configuration plus the current condition thereof (near term viewpoint)
- just system configuration alone (long term viewpoint)

6. Try to find a method that was clearly understandable

Members of the committee expressed a desire to devise a method where any individual could trace how a change in input data produced a change in the output - something that had not been found possible with the need study

WORK PLAN

The SRFDAC Committee performed its work in the following sequence:

1. **REVIEW** - All past efforts to research and revise county RUTF allocation methods were re-read.
2. **STUDY** - The committee evaluated options such as converting the need study to a desktop computer basis, finding out how other states allocate county funds, and commissioned a special Iowa Highway Research Board project to investigate the merits of using Automatic Pavement Distress data in any new formula(s).
3. **DEVELOP** - Starting from the results of the final, 2002 need study, the committee explored and tested alternate methods
4. **PROPOSE** - After evaluating all new ideas against the committee goals, a final distribution method was selected and proposed
5. **SEEK AUTHORITY** - The committee then sought authority from both the County Engineer and County Supervisor Associations to present the proposed method to their memberships.
6. **INFORM** - All counties were informed of the committee's work and proposal via two rounds of district meetings. (12 in all)
7. **SEEK CONSENSUS** - Again, after obtaining support from the ICEA and ISACS Executive Boards, the committee asked all counties to officially indicate if they would support or oppose the proposed method. [89 registered in favor, 7 against, and 3 did not reply]
8. **RECOMMEND** - Finally, the committee met with county legislative representatives, and the DOT, and developed the legislative proposal contained in this report.

TIME TABLE

The committee's activities of the last two and a half years are outlined below:

| | |
|------------------|--|
| Fall 2002 | Getting organized, setting goals, and reviewing past efforts. |
| Spring 2003 | Studying different states' methods and other research efforts. |
| Summer/Fall 2003 | Analysis of past needs studies and synthesis of three concepts. |
| Winter 2003/2004 | Evaluation of alternates and selection of preferred option. |
| Spring 2004 | Seeking of authority from ICEA and ISACS Executive Boards, followed by six district meetings to present and explain the proposed concept. |
| Summer 2004 | Additional presentations made around the state in conjunction with the Iowa State Association of Counties June legislative workshop meetings. |
| Fall 2004 | Obtained recommendations in favor of endorsement from ICEA and ISACS Executive Boards, followed by distribution of model Resolution of Endorsements to counties and collection of the results. Also - work with ISAC to get the proposal formally included in that organization's list of legislative priorities for 2005. |
| Winter 2004/2005 | Preparation of Legislative proposal, drafting of this report, and support of the Legislative process. |

REVIEWS

The Committee commenced work by reviewing the findings of past research on RUTF allocations the Quadrennial Needs Study:

1989 Road Use Tax Distribution Study - Resulted in legislation to change county RUTF distribution allocation from 60 percent needs and 40 percent area to 70 percent needs and 30 percent area.

Iowa Highway Research Board studies

- 1993 - HR 363 - "Clarifying the Quadrennial Needs Study Process"
- 1997 - HR 386 - "Allocation of County RUTF via Technical Factors"
- 1998 - TR 418 - "Feasibility of Using Automated Distress Data in the County Need Study"
- 2001 - TR 433 - "Highway Needs Methodology - Analysis and Evaluation"
- 2002 - TR 417 - "Total Cost of Transportation-Analysis of Road and Highway Issues"

These prior projects confirmed the problems of the need study methodology and tried, with limited success, to find remedies for them.

2002 NEED STUDY

A number of improvements recommended by TR 433 were applied to the 2002 need study process. Pavement condition data was made current statewide and gravel road condition ratings were replaced with more reliable formulas. These changes produced results that were judged, by the committee to be the most fair and accurate ever done, even though they still showed fluctuations relative to past studies. As a result, the SRFDAC committee felt it could serve as the 'control' against which other methods should be compared.

ADDITIONAL INVESTIGATIONS

- With the reviews complete, the committee investigated other sources of ideas and information. They consulted with the DOT, ISU's Center for Transportation Research and Education [CRTE], and the Iowa County Engineers Association Service Bureau regarding the feasibility of further improving the need study and converting it to run on a desktop PC rather than a mainframe. [*Findings: It would cost at least \$100,000 to make the conversion, additional staff time would be required at the Service Bureau, and there'd be no guarantee of better performance.*]
- A special research project showed that automated distress data collections could provide accurate current condition data on pavements, but at considerable cost.
- Off the shelf software from the FHWA, such as PONTIS and HERS was evaluated and found too narrow in scope.
- Data on practices in Minnesota, Wisconsin, Illinois, Missouri, Kansas, Nebraska and several other states were collected. Most indicated a long term view point.

SYNTHESIS OF NEW METHODS

Following the review and study period, the committee began searching for new methods that would best fit Iowa's situation.

The work started with an attempt to develop allocation factors based on the TR-417 "Total Cost of Transportation-Analysis of Road and Highway Issues" research project. While it proved possible to do so, the results varied from the 2002 need study significantly enough that an effort was launched to figure out where and why the two differed. This work revealed that although the 2002 need study results were generally good, there were still instances where like counties weren't treated alike. So, the committee decided to try to develop a mathematical model of the 2002 need study itself. At first the idea was to use the model as a 'control' against which new ideas could be measured but later the goal came to be simply to build a best fit model from the 2002 data.

The committee began exploring whether or not they could find relationships between system parameters, such as traffic, area of county, population, miles of pavement, miles of gravel, number of bridges, etc,

Three approaches were studied:

1. Full System Regression - this method attempted to use curve fitting tools to find a best fit formula based on parameters, such as road miles, multiplied by a weighting factor and fitted to a curve. *[Findings: the results came out acceptably close to the 'control' data but the formula was too complex to be useful.]*
2. System component regression - this approach used individual formulas to calculate 'points' for each parameter. The points were then multiplied by weighting factors and combined. *[Findings: the results came in slightly better, but the formula was still too complex.]*
3. Factor Breakdown method - in this alternate, a total of 100 percentage points was broken down, with various amounts pro-rated amongst the counties according to their shares of various quantitative measures. *[Findings: this method provided the best fit with the 'control', turned out easiest to understand and calculate, and fulfilled the original goals.]*

Over fifty different combinations of factors were used in the method development work. Ultimately, the committee discovered that the factors that best correlated to the 2002 need study were: Total area, rural population, total daily traffic, un-surfaced miles, granular surfaced miles, paved miles, and total center-line lineal feet of NBIS bridges in each county.

EVALUATION AND SELECTION

All three methods developed by the committee were evaluated on multiple levels. Testing was performed to determine:

1. Did the formula fulfill the original goals?
Although all three new ideas did reasonably well, the Factor Breakdown Method came closest to fulfilling all original goals. Of special note, it was by far the most understandable. And it did a good job of treating like counties alike.
2. Did the formula provide a good fit with the 2002 need study results? The committee evaluated 'fit' with a scoring system that favored the majority without unduly penalizing any outliers. The Factor Breakdown method gave the best scores of any method tried.
3. Would the formula dampen or magnify changes in input data?
All three methods were tested to see what would happen to their results if there were sudden, major changes in input data. All three approaches tended to dampen sudden shifts, yet demonstrated an ability to respond to long term trends.
4. Could it be phased in without causing undo distress to any single county's budgeting? It was found that a five year phase in would smooth out the transition from a need study based allocation to the new basis sufficiently that all but a few counties would see continued revenue growth throughout that time period.
5. Did the results fit within each county's range of allocation factors from the last 20 years? Although the new formula results for each county did not always come out the same as the 2002 factors, they did generally fall within each county's long term range.

A key determination made in the process of developing the new formulas was that stability of funding was as important as trying to match current needs. Therefore, the new formulas adopted a long term view point and the committee concluded that collection of pavement condition data would no longer be a necessary input.

PROPOSED NEW METHOD

The following table shows how the total percentage of the Secondary and Farm-to-Market allocations are proposed to be broken down by the listed factors:

| Factor | Secondary Road Fund Weighting | Farm-to-Market Road Fund Weighting | Factor explanation |
|----------|-------------------------------|------------------------------------|--|
| Area | 30% | 30% | Total area of each county, including urban areas - serves as measure of system size and extent |
| Pop | 10% | 15% | Rural population living outside incorporated areas |
| VMT | 12.5% | 10% | "Vehicle Miles of Travel per day" -- a measure of total traffic |
| Dirt | 0.5% | 0% | Miles of un-surfaced roads |
| Granular | 20% | 9% | Miles of granular surfaced roads |
| Paved | 13% | 23% | Miles of paved, seal-coated or otherwise weatherproofed roads |
| -LFBD- | 14% | 13% | Total lineal feet of bridge deck of all structures included in National Bridge Inventory [Span >= 20 ft] |
| | 100% | 100% | |

The calculation of the Secondary Road factor for a single county would be as shown below:

| SRF | | | | | | \$ 243,780,000 | |
|---|--------------|-------------|-------------|------------------|---|---------------------------|---------------------|
| This worksheet shows how a county's allocation factors would be computed under the Factor Breakdown Method | | | | | | = 100 pts | |
| FBF results using 2002 NS data | | | | | | | Sec Rd factor |
| Factor | Factor units | County data | State Total | Percent of Total | x | Statewide point breakdown | = County points |
| TtlArea | Sq. Mi. | 572.0 | 56,147 | 1.0188% | | 30 | 0.305626302 |
| RrlPop | Count | 4,997.0 | 660,960 | 0.7580% | | 10 | 0.075602154 |
| TtlVMT | VMT | 157,037.0 | 14,857,846 | 1.0589% | | 12.5 | 0.132116223 |
| Dirt | Mi. | 15.0 | 4,697 | 0.3184% | | 0.5 | 0.001592188 |
| Gravel | Mi. | 800.0 | 66,992 | 1.19411% | | 20 | 0.238822366 |
| Paved | Mi. | 181.3 | 18,197 | 0.9984% | | 13 | 0.129527157 |
| -LFBD- | Ft. | 15,763.0 | 1,478,518 | 1.0681% | | 14 | 0.149258920 |
| | | | | | | 100.000000 | 1.032545312 |
| | | | | | | | \$ 2,517,139 |
| | | | | | | | Est. SRF allocation |

FINAL RECOMMENDATIONS

After consulting with all counties and ascertaining that a high level of support existed among them, the Secondary Road Fund Distribution Advisory Committee voted to formally propose to the Legislature that the Factor Breakdown Method be adopted to replace the Quadrennial Needs Study as the distribution of county Secondary Road and Farm-to-Market funds.

It is recommended that the SRFDAC committee be permanently vested with the duty and authority to formally adopt the method through Administrative Rule making procedures; that the ICEA Service Bureau be designated to annually re-compute distribution factors by applying the adopted formula to data supplied by the Iowa Department of Transportation; and that the adoption of the new method be phased in over a five year period beginning with Fiscal Year 2007.

The phase in would work as follows:

FY 2006 -- 100% need study

FY 2007 -- 80% need study / 20% new method

FY 2008 -- 60% need study / 40% new method

FY 2009 -- 40% need study / 60% new method

FY 2010 -- 20% need study / 80% new method

FY 2011 and beyond -- 100% new method

Detailed description of the Factor Breakdown method:

1. Definitions

- a. **Rural population** : the count, taken from the most recently certified decennial US Census, of persons who reside in the unincorporated areas of a county.
- b. **Daily Vehicle Miles of Travel**: the product of a road segment's length, in miles, multiplied by the daily traffic count thereon, in vehicles per day, reported for that segment by the Iowa DOT, based on the most recent counts available.
- c. **Earth surfaced** : roads under the jurisdiction of a county secondary roads department which are not surfaced.
- d. **Granular surfaced** : roads under the jurisdiction of a county secondary roads department which have crushed rock, gravel, or oiled earth surfaces.
- e. **Paved surfaced**: roads under the jurisdiction of a county secondary roads department with hot mix asphalt, Portland cement concrete, or stabilized base with waterproof surfacing.
- f. **Bridges**: those structures under the jurisdiction of a county secondary roads department which are included in the National Bridge Inventory System.

2. Method for determining Secondary Road Allocation factors

The Iowa County Engineers Association Service Bureau shall annually compute percentage distribution factors for the allocation of Secondary Road RUTF revenues, (per 2003 Iowa Code Sections 312.2 and 312.3), among the counties by calculating and summing the following percentage sub-totals for each county:

- a. Thirty percent times the ratio that the total area of each county bears to the total area of the state.
- b. Ten percent times the ratio that the rural population of each county bears to the total rural population of the state.
- c. Twelve and one half percent times the ratio that the total daily vehicle miles of travel on each county's secondary roads bears to the total daily vehicle miles of travel on all secondary roads in the state.
- d. One half percent times the ratio that the earth surfaced miles of secondary roads of each county bears to the total miles of earth surfaced secondary roads in the state.
- e. Twenty percent times the ratio that the granular surfaced miles of secondary roads of each county bears to the total miles of granular surfaced secondary roads in the state.
- f. Thirteen percent times the ratio that the paved surfaced miles of secondary roads of each county bears to the total miles of paved surfaced secondary roads in the state.
- g. Fourteen percent times the ratio that the length, in lineal feet, of secondary road bridges of each county, as reported in the Iowa DOT's road and bridge inventory system, bears to the total length of secondary road bridges in the state.

3. Method for determining Farm-to-Market Road Allocation factors

The Iowa County Engineers Association Service Bureau shall annually compute percentage distribution factors for the allocation of Farm-to-Market RUTF revenues, (per 2003 Iowa Code Sections 312.2 and 312.5), among the counties by calculating and summing the following percentage sub-totals for each county:

- a. Thirty percent times the ratio that the total area of each county bears to the total area of the state.
- b. Fifteen percent times the ratio that the rural population of each county bears to the total rural population of the state.
- c. Ten percent times the ratio that the total daily vehicle miles of travel on each county's farm-to-market roads bears to the total daily vehicle miles of travel on all farm-to-market roads in the state.
- d. Nine percent times the ratio that the granular surfaced miles of farm-to-market roads of each county bears to the total miles of granular surfaced farm-to-market roads in the state.
- e. Twenty three percent times the ratio that the paved surfaced miles of farm-to-market roads of each county bears to the total miles of paved surfaced farm-to-market roads in the state.
- f. Thirteen percent times the ratio that the length, in lineal feet, of farm-to-market road bridges of each county, as reported in the Iowa DOT's road and bridge inventory system, bears to the total length of farm-to-market road bridges in the state.